

REMARKS

Claims 1-7 and 10-20 are pending in this application. Claims 1, 3, 5 and 16 are currently amended. Claims 8 and 9 are canceled.

The Examiner objected to the drawings for failing to show all of the features of claim 8 and 9. Applicants respectfully traverse the Examiner's objections. Nevertheless, Applicants have canceled claims 8 and 9 to expedite prosecution.

The Examiner rejected claims 1-20 under 35 U.S.C. Section 101 as directed to non-statutory subject matter. Applicants respectfully traverse the Examiner's rejections.

Claim 1, as amended, recites, "[a] linear scalable method of processing a digital signal ... comprising ... storing the transformed signal." Processing a digital signal and storing the results is a practical application. Claim 3 as amended similarly recites, "[a] linear scalable system to process a digital signal ... comprising ... means for storing inputs and output of the means for computing." The Examiner contends that software modules are not patentable subject matter. Claim 3, however, is not a software claim, and recites means for storing the inputs and outputs of the system to process a digital signal. Accordingly claims 1 and 3 are directed to statutory subject matter. Claims 3, 4, 7 and 10-15 are allowable at least by virtue of their dependencies.

Claim 5, as amended, recites, "[a] computer program product comprising computer readable program code stored on a computer readable storage medium embodied therein for processing a digital signal ... comprising ... computer readable program code means configured for storing the transformed signal." The Examiner contends claim 5 is "software per se," without providing any explanation for this assertion. Claim 5, both before and after amendment, is directed to a practical application and thus is directed to statutory subject matter. Claim 6 depends from claim 5 and is allowable at least by virtue of its dependency.

Claim 16, as amended, recites, "[a] computer-readable memory medium whose contents cause a system having a plurality of processors to perform a linear scalable method of transforming a signal, the method comprising: ... storing the transformed signal." The Examiner contends that claims 16-20 are "non-functional medium," without providing an explanation. Claim 16 as amended is directed to a practical application, namely transforming a signal and

storing the transformed signal, and thus is directed to statutory subject matter. Claims 17-20 are allowable at least by virtue of their dependencies.

The Examiner rejected claims 1-20 under 35 U.S.C. Section 103(a) as rendered obvious over U.S. Patent No. 5,991,787 issued to Abel, et al., in view of U.S. Patent No. 6,792,441 issued to Jaber. Applicants respectfully traverse the Examiner's rejections.

Applicants previously argued that Abel was not an appropriate primary reference because the claims in the present application are directed to linearly scalable methods, systems and products for computing FFTs or inverse FFTs on multiprocessor systems, while Abel is directed to reducing peak spectral error for a specific processor, namely an MMXTM processor, using a specific instruction set and configuration. Abel reduces peak spectral error using rounding. Abel is not directed to linear scalability. Thus, the Examiner's assertion that Abel discloses "a linear scalable method" is incorrect.

In the Final Office Action, the Examiner points to Figure 7 of Abel as disclosing linear scalability. Specifically, the Examiner contends Figure 7 shows "input coefficients can be any size." Final Office Action, paragraph 8(a). The specification of the present application defines linear scalability as "the computation time reducing in inverse proportion to the number of processors in the multiprocessor solution." Specification at page 3, lines 11-14. Even assuming Figure 7 somehow shows that input coefficients can be any size (it does not, and the Examiner has failed to provide support for any argument that "input coefficients can be any size" is inherent in Figure 7), Figure 7 of Abel and the description thereof do not address linear scalability of a multi-processor system. Thus, Applicants continue to contend that Abel is not an appropriate primary reference because it does not address lineary scalability. Further, Jaber is directed to specific hardware architectures, and is not directed to achieving linear scalability. Thus one would not be motivated to combine Abel and Jaber to obtain linear scalability in a multiprocessor system.

Alternatively, the Examiner declined to give any patentable weight to linear scalability because it is recited in the preamble of the claims. The body of the present claims, however, does not stand alone from the linear scalability of the preamble. For example, independent claim 1 recites, "distributing the plurality of butterfly operations in each stage of the

first plurality of stages such that each processor computes an equal number of complete butterfly operations thereby eliminating data interdependency in the stage.” Thus, the preamble gives life and meaning to the claims, and accordingly is to be given patentable weight. *See In re Cruciferous Sprout Litigation*, 310 F.3d 1343, 1347-48 (Fed. Cir. 2002).

Turning to the language of the claims, claim 1 as amended recites, “[a] linear scalable method ... comprising ... computing an N-point FFT/IFFT of the signal using a first plurality of butterfly computational stages, each stage in the first plurality of stages employing a plurality of butterfly operations having a first radix, wherein each of the butterfly operations in each stage in the first plurality of stages has a single, un-nested computation loop of the first radix, wherein each of the butterfly operations in each stage in the first plurality of stages has a single, un-nested computation loop of the first radix.” Claim 16 recites similar language. Neither Abel nor Jaber teach, suggest or motivate a linear scalable method comprising a first plurality of stages employing a plurality of butterfly operations having a first radix, wherein each of the butterfly operations in each stage in the first plurality of stages has a single, un-nested computation loop of the first radix, as recited. Accordingly, claims 1 and 16 are not rendered obvious by Abel, alone or in combination with Jaber. Claims 2, 7, 10 and 11 depend from claim 1 and claims 17-20 depend from claim 16, and are allowable at least by virtue of their dependencies.

Claim 3 as amended recites, “[a] linear scalable system ... comprising: means for computing a plurality of stages of an N-point FFT/IFFT using in each stage of the plurality of stages a plurality of butterfly operations, wherein each butterfly operation employs a single butterfly computation loop of a first radix and without employing nested loops.” Neither Abel nor Jaber teach, suggest or motivate a linear scalable system comprising: means for computing a plurality of stages of an N-point FFT/IFFT using in each stage of the plurality of stages a plurality of butterfly operations, wherein each butterfly operation employs a single butterfly computation loop of a first radix and without employing nested loops, as recited. Accordingly, claim 3 is not rendered obvious by Abel, alone or in combination with Jabar. Claims 4 and 12-15 depend from claim 3, and are allowable at least by virtue of their dependencies.

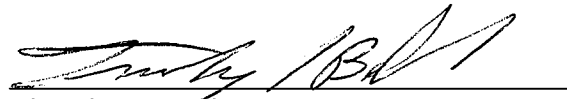
Claim 5, as amended, recites, “[a] computer program product ... for computing a Fast Fourier Transform (FFT) or Inverse Fast Fourier transform (IFFT) in a multiprocessing system using a decimation in time linear scalable approach, comprising: computer readable program code means configured for ... implementing the remaining ($\log_2 N - 2$) stages using radix-2 butterfly operations, wherein each radix-2 butterfly operation employs a single radix-2 butterfly computation loop without employing nested loops.” As mentioned above, neither Abel nor Jaber teach, suggest or motivate a linear scalable method. Thus, claim 5 is not rendered obvious by Abel, alone or in combination with Jaber. Claim 6 depends from claim 5 and is allowable at least by virtue of its dependency. Accordingly, claims 1-20 are not rendered obvious by Abel, alone or in combination with Jaber.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable.
Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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